

Two small, nearly perfect, earthenware vessels were also found, similar to those known to have been made by the Arawáks. One of these *sappooras* is oval in shape, 7 inches in length and 2 inches high, with a rude handle at each end; the other is round, with a small ledge below the upper margin. Along with these were fragments of pottery belonging to a much larger specimen.

The cave was discovered by the Rev. W. W. Rumsey on the Halberstadt estate belonging to Mr. Gossett. It is in a wild rocky part of the Port Royal Mountains, at a height of about 2000 feet above the sea. The narrow entrance in the face of the hill-side was blocked by boulders of limestone. On removing these, a cavern with waterworn sides, partially covered with stalactitic deposits, was displayed, penetrating into the rock for a distance of about 20 feet, and in some places two or three feet high. The floor is covered with a deposit about 12 inches thick, of a fine, light yellowish dust, but the remains were superficial.

The size of the cave is not such as could possibly contain the whole of the individuals when alive, so that it is probable that it must have been used at one time as a burial-place; while the presence of the canoe, mortar, earthenware, coney bones, marine shells, and a flint implement, is suggestive that some of the people may have lived or fled there for safety, and perhaps been immured by their destroyers, the Spaniards. Whatever may be the explanation of their occurrence, the acquisition of the remains, which have been presented to the Museum, will be a great addition to the archaeology of Jamaica.

Museum, Jamaica, May 28.

J. E. DUERDEN.

### The Antiquity of the Medical Profession.

WITH reference to Mr. H. Spencer's article on the evolution of the medical profession, in the *Contemporary Review* for June, it may be inferred that his remarks should only apply to its historical state in Britain, and not to that in European countries.

It may be pointed out that the profession had existed many centuries before that epoch in the Roman and Grecian nations, as may be seen by any one in looking over Lemprière's Dictionaries.

We have their medical works handed down to us in Celsus (14 A.D.) and Hippocrates (422 B.C.); likewise the Greek army at Troy (1184 B.C.) had military surgeons (Machaon); and Prof. Simpson had discoursed on those in the Roman armies—papers indicated 1856.

See also Dr. Smith's Dictionary, "Greek and Roman Antiquities," for articles on the subjects under:—Art. Medicus, art. Medicina, art. Chirurgia, art. Physiologia.

The art of medicine seems to have been ushered off the stage in the Dark Ages, and to have been consigned to the care of the monasteries and monks for a long period.

It would seem then, from history, that the medical profession is quite as old as either that of theology or law.

Edinburgh, June 17.

W. G. BLACK.

### A History of British Earthquakes.

ON two or three occasions you have allowed me to ask the readers of NATURE for aid in studying recent British earthquakes, and I have gratefully to acknowledge the valuable assistance which I have thus obtained.

If I might trespass once more upon your space, I should be glad to mention that I am now preparing a history of British earthquakes during the nineteenth century, and would thankfully receive notices of any shocks, either past or future, which your readers may be able and willing to send me. Extracts from provincial newspapers, from private diaries, or from any other trustworthy source, would be most useful.

With a view to aiding in the more careful observation of earthquakes in the future, I have drawn up a short paper of suggestions, and this I shall be happy to send to any one who may wish for it on receipt of his name and address. Those who desire to examine accounts of recent earthquakes in this country, I may refer to the *Proceedings* of the Royal Society for 1894, the *Quarterly Journal* of the Geological Society for 1891, and the *Geological Magazine* for 1891-1893.

CHARLES DAVISON.  
373, Gillott Road, Birmingham, June 17.

### TERMS OF IMPRISONMENT.

IT would have been expected that the various terms of imprisonment awarded by judges should fall into a continuous series. Such, however, is not the case, as is shown by Table I., which is derived from a Parliamentary Blue-book recently published under the title of "Part I.—Criminal Statistics," p. 215. The original has been considerably reduced in size; first, by limiting the extracted data to sentences passed on male prisoners without the option of a fine, and, secondly, by entering the number of sentences to the nearest tenth or hundredth, as stated in the headings to the columns. The material dealt with is thereby more homogeneous than in the original, and its significance is more easily seen. The number of cases is amply sufficient to afford a solid base for broad conclusions, there being in round numbers 830 sentences for various terms of years, 10,540 for various terms of months, and 43,300 for various terms of weeks. The diagram drawn from Table I. gives a still clearer view of the distribution of these sentences:—

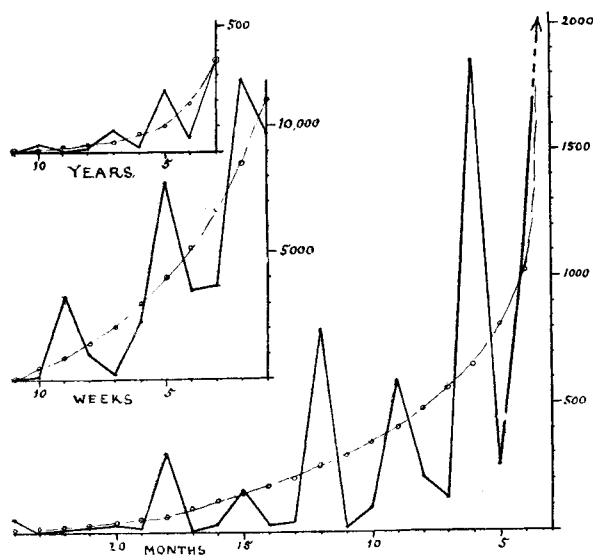
TABLE I.—Distribution of Sentences.

| Length of sentence. | One tenth (to nearest integer) of the number of sentences. |           | Length of sentence. | One tenth (to nearest integer) of the number of sentences. |           | Length of sentence. | One tenth (to nearest integer) of the number of sentences. |           | Length of sentence. | One hundredth (to nearest integer) of the number of sentences. |           |
|---------------------|------------------------------------------------------------|-----------|---------------------|------------------------------------------------------------|-----------|---------------------|------------------------------------------------------------|-----------|---------------------|----------------------------------------------------------------|-----------|
|                     | Recorded.                                                  | Smoothed. |                     | Recorded.                                                  | Smoothed. |                     | Recorded.                                                  | Smoothed. |                     | Recorded.                                                      | Smoothed. |
| Years.              |                                                            |           | Months.             |                                                            |           | Months.             |                                                            |           | Weeks.              |                                                                |           |
| 16—                 | 0                                                          |           | 24—                 | 5                                                          | 1         | 10—                 | 9                                                          | 34        | 11—                 | 0                                                              | 0         |
| 15—                 | 1                                                          |           | 23—                 | 0                                                          | 2         | 9—                  | 59                                                         | 40        | 10—                 | 1                                                              | 5         |
| 14—                 | 1                                                          |           | 22—                 | 1                                                          | 2         | 8—                  | 21                                                         | 47        | 9—                  | 33                                                             | 9         |
| 13—                 | 0                                                          |           | 21—                 | 2                                                          | 3         | 7—                  | 13                                                         | 56        | 8—                  | 10                                                             | 14        |
| 12—                 | 1                                                          |           | 20—                 | 3                                                          | 4         | 6—                  | 185                                                        | 65        | 7—                  | 2                                                              | 21        |
| 11—                 | 0                                                          | 1         | 19—                 | 2                                                          | 5         | 5—                  | 26                                                         | 81        | 6—                  | 23                                                             | 30        |
| 10—                 | 3                                                          | 1         | 18—                 | 30                                                         | 6         | 4—                  | 112                                                        | 102       | 5—                  | 77                                                             | 40        |
| 9—                  | 0                                                          | 2         | 17—                 | 0                                                          | 9         | 3—                  | 480                                                        | 480       | 4—                  | 35                                                             | 52        |
| 8—                  | 1                                                          | 3         | 16—                 | 3                                                          | 12        |                     |                                                            |           | 3—                  | 37                                                             | 67        |
| 7—                  | 8                                                          | 4         | 15—                 | 16                                                         | 14        |                     |                                                            |           | 2—                  | 118                                                            | 85        |
| 6—                  | 2                                                          | 7         | 14—                 | 3                                                          | 17        |                     |                                                            |           | 1—                  | 97                                                             | 110       |
| 5—                  | 24                                                         | 10        | 13—                 | 4                                                          | 20        |                     |                                                            |           |                     |                                                                |           |
| 4—                  | 6                                                          | 19        | 12—                 | 79                                                         | 25        |                     |                                                            |           |                     |                                                                |           |
| 3—                  | 36                                                         | 36        | 11—                 | 1                                                          | 29        |                     |                                                            |           |                     |                                                                |           |
|                     | 83                                                         | 83        |                     | 149                                                        | 149       |                     | 905                                                        | 905       |                     | 433                                                            | 433       |

NOTE.—In reading the table, "16—" means "16 and above 15"; "15—" means "15 and above 14"; &c. The number of these intermediate cases are presumably insignificant; they are not noticed in the diagram, where all cases are referred to the upper of their limiting values.

The extreme irregularity of the frequency of the different terms of imprisonment forces itself on the attention. It is impossible to believe that a judicial system acts fairly, which, when it allots only 20 sentences to 6 years imprisonment, allots as many as 240 to 5 years, as few as 60 to 4 years, and as many as 360 to 3 years. Or that, while there are 20 sentences to 19 months, there should be 300 to 18, none to 17, 30 to 16, and 150 to 15. The terms of weeks are distributed just as irregularly. Runs of figures like these testify to some powerful cause of disturbance which interferes with the orderly distribution of punishment in conformity with penal deserts.

On examining the diagram we are struck with the apparent facility of drawing a smooth curve, that shall cut off as much from the hill-tops of the irregular trace as will fill their adjacent valleys. This has been done, by eye, in the diagram, the small circles indicating the smoothed values. Care has been taken that the sums of the ordinates drawn to the smooth curves should be equal to sums of those drawn to the traces, as is shown by the totals in the bottom line of Table I. The smoothed curves may therefore be accepted as an approximate rendering of the general drift of the intentions of the judges as a whole, and show that the sentences passed



by them severally, ought to be made more appropriate to the penal deserts of the prisoners than they are at present. The steep sweeps of the curves afford a strong testimony to the discriminative capacity of the judges, for if their discrimination had been *nil* and the sentences given at random, those steep curves would be replaced by horizontal lines. We have now to discuss the disturbing cause or causes that stand in the way of appropriate sentences.

The terms of imprisonment that are most frequently awarded, fall into rhythmic series. Beginning with the sentences reckoned in months, we see that their maxima of frequency are at 3, 6, 9, 12, 15, and 18 months, which are separated from one another by the uniform interval of 3 months, or a quarter of a year—a round figure that must commend itself to the judge by its simplicity. And we may in consequence be pretty sure that if the year had happened to be divided into 10 periods instead of 12, the exact equivalent of 3 months, which would then have been  $2\frac{1}{2}$  periods, would not have been used in its place. If this supposition be correct, the same penal deserts would have been treated differently to what they are now.

Thus the precise position of the maxima has been

apparently determined by numerical fancy, and it seems that the irregularity of the trace is mainly due to the award of sentences being usually in terms of the 3-monthly, but sometimes in that of the 1-monthly, series. The trustworthiness of this solution is tested by grouping the entries in sets of three, each set having one of the maxima for its middle member, as shown in Table II. (where, however, the first and last entries are perforce limited to sets of two). The agreement between the recorded and the smoothed entries is now passably good; it would become somewhat closer if the smoothed curve were revised by paying regard to the series of sets of three, thereby taking facts into account that were not utilised before.

TABLE II. (derived from Table I.).

| Terms of sentence in months. | Number of sentences. |           |
|------------------------------|----------------------|-----------|
|                              | Recorded.            | Smoothed. |
| 24 and 23                    | 5                    | 3         |
| 22 — 20                      | 6                    | 9         |
| 19 — 17                      | 32                   | 20        |
| 16 — 14                      | 22                   | 43        |
| 13 — 11                      | 84                   | 74        |
| 10 — 8                       | 89                   | 121       |
| 7 — 5                        | 224                  | 202       |
| 4 and 3                      | 592                  | 582       |
|                              | 1054                 | 1054      |

This solution does not, however, account for all the peculiarities of the irregular trace. For instance, in the original table in the Blue-book, absolutely not a single sentence of 17 months has been recorded, although there are 32 sentences of 16 months, and 340 of 18. I account for the absence of the number 17, by the undoubted fact that almost all persons have a disposition to dwell upon certain numbers, and an indisposition to use others, and that 17 is one of the latter. These curious whimsies become conspicuous whenever calculators, who are not forewarned, are set to record long series of measures, entering them *by estimation* to the nearest decimal of the divisions of the scale they use. Each figure from 0 to 9, in the decimal place, ought then to occur with equal frequency, but they never do; there is always a run upon some figures, while others are hardly, if ever, introduced. The fancies in this respect of different persons differ widely; the biblical Jews, for example, were fond of 40, apparently employing it as a noun of indefinite multitude, but it has no preferential use with us. On the other hand, it is probable that a large and awkward prime number, such as 17, would be generally in disfavour.

As regards the sentences reckoned in years, they range from 3 years upwards (those between 2 and 3 years being here reckoned as 3 years, while those below 2 years are reckoned, as above, in months). The maxima of frequency in this group are at 3, 5, 7, and 10 years, showing a tendency to a unit of 2 years at first, and then, presumably guided by the habit of decimal notation, to jump from 7 to 10. The bias due to decimal notation is forcibly shown by some entries in the original table which fall outside the limits of Table I. It there appears that 7 sentences were awarded for 20 years, and 6 for 15 years, but absolutely none for the 4 intermediate years, 19, 18, 17, 16. It should be added that there were also 8 sentences for 14 and for 12 years respectively. Had these appeared in Table I, they would have been entered to their nearest tenths, that is as 1 in each case, but I did not care to enlarge the table for the sake of including these, comparatively few, additional cases.

The sentences in terms of weeks have their maxima at 2, 5, and 9, for reasons which I do not as yet understand sufficiently to write about.

The general result is that if the judges were to act on uniform rules, the curve of distribution of terms of sentence would be mainly dependent on two sets of causes only, and would become much smoother in consequence. These are: (1) The distribution of true penal deserts; (2) errors of estimation, which would be distributed about each point in the true curve, according to the ordinary law of frequency of error, and with a modulus that might perhaps be determined.

It would be interesting to tabulate the sentences passed by the several judges since their appointments, to discover their respective peculiarities and personal equations, all who exercise extensive jurisdiction in criminal cases being included under the title of judge. We test the acquirements of youths by repeated examinations, but do not as yet employ the methods of statistics to test the performances of professional men. Examiners, for example, should themselves be tested in this way, and I have a fancy that a discussion of the clinical reports at the various large hospitals might enable a cautious statistician to express with some accuracy the curative capacities of different medical men, in numerical terms. Before putting oneself into the hands of any new professional adviser, it would certainly be a grateful help to know the indexes of capacity of those among whom the choice lay, not merely such as might be inferred from their performances in school and undergraduate days, or by their unchecked professional repute, but as they really are in their mature and practical life.

I will conclude by moralising on the large effects upon the duration of a prisoner, that flow from such irrelevant influences as the associations connected with decimal or duodecimal habits and the unconscious favour or disfavour felt for particular numbers. These trifles have been now shown on fairly trustworthy evidence to determine the choice of such widely different sentences as imprisonment for 3 or 5 years, of 5 or 7, and of 7 or 10, for crimes whose penal deserts would otherwise be rated at 4, 6, and 8 or 9 years respectively. FRANCIS GALTON.

#### PROFESSOR FRANZ NEUMANN.

AS already announced (p. 133) Prof. Neumann, the eminent physicist and mathematician, died on May 23 at Königsberg at the age of ninety-seven. At a recent meeting of the Paris Academy, the Secretary, M. Bertrand, in announcing the loss the Academy had sustained by the death of such a distinguished Correspondent in the Geometry Section, pronounced the following short *éloge* on Prof. Neumann's contributions to knowledge:—

"Franz Neumann, Professor of Physics and Mineralogy at the University of Königsberg, made his *début* in science more than seventy years ago, by some beautiful works on mineralogy. Soon after he directed his studies towards physics, and by an admirable 'Mémoire sur la Théorie des Ondulations,' which was presented to the Berlin Academy in 1835, he took his place among the masters of science. Neumann, like Cauchy, but by very different means, was led to consider luminous vibrations as taking place in the plane of polarisation, while Fresnel thought them perpendicular; he knew how to follow in the most minute details, always in accordance with the observation, the mathematical consequences of his hypothesis. But Fresnel's theory is not contradicted by any of the experiments, so doubt continues, and the ever renewed discussions, whatever their conclusion may be, will remain a noble homage to the man of science and profound physicist who was the first to start them.

"Neumann's memoir on induction showed again the

great mathematical skill of its author. In it Neumann translated, by general formulæ, the discoveries of Faraday and Lenz's laws; it is to him that we owe the expression of the potential of a system of two closed currents, of which merely the existence, independently of the very elegant form which he has given it, has played such a great part in science.

"Franz Neumann was a great Professor. Even at the age of ninety he attracted numerous auditors; his lessons, received and written out by learned students, have been studied in all the universities of Europe. The study of physics was his aim; but when he came across a fine mathematical problem, he excelled in interesting his auditors by initiating them occasionally into the highest theories of analysis. It is with justice that in 1863 the Section of Geometry, making amends for a long neglect, elected this illustrious physicist into the Academy."

#### NOTES.

THE annual meeting of the Royal Society for the election of Fellows was held on Thursday last, when the following gentlemen were elected into the Society:—Mr. J. Wolfe Barry, C.B., Prof. A. G. Bourne, Mr. G. H. Bryan, Mr. John Eliot, Prof. J. R. Green, Mr. E. H. Griffiths, Mr. C. T. Heycock, Prof. S. J. Hickson, Major H. C. L. Holden, Dr. Frank McClean, Prof. William MacEwen, Dr. Sidney Martin, Prof. G. M. Minchin, Mr. W. H. Power Prof. T. Purdie.

MR. C. C. HARRISON has presented a sum of £100,000 to the University of Pennsylvania, in memory of his father, Dr. George Lieb Harrison. The fund is to be known as the "George L. Harrison Foundation for the Encouragement of Liberal Studies and the Advancement of Knowledge." Only the income from the fund can ever be used, and it must be devoted to the establishment of scholarships and fellowships intended solely for men of exceptional ability; to increasing the library of the University, particularly by the acquisition of works of permanent use and of lasting reference to and by the scholar; to the temporary relief from routine work of professors of ability in order that they may devote themselves to some special work; or to securing men of distinction to lecture and for a term to reside at the University.

Science gives the following as the preliminary arrangements for the forty-fourth meeting of the American Association for the Advancement of Science, to be held in Springfield, Mass., from August 28 to September 7, 1895:—At the first general session the President-elect, Prof. E. W. Morley, will be introduced by the retiring President, Prof. D. G. Brinton, who will afterwards give an address on "The Aims of Anthropology." The Presidents of the sections, and the subjects of some of their addresses, are as follows:—Section of Physics: "The Problem of Aerial Locomotion," W. Le Conte Stevens. Section of Anthropology: F. H. Cushing. Section of Geology and Geography: "The Geological Survey of Virginia, 1835-1841—its History and Influence in the Advancement of Geologic Science," Jed. Hotchkiss. Section of Economic Science and Statistics: "The Providential Function of Government in Relation to Natural Resources," B. E. Fernow. Section of Chemistry: McMurtrie. Section of Botany: "The Development of Vegetable Physiology," J. C. Arthur. Section of Mechanical Science and Engineering: William Kent. The affiliated societies meeting in conjunction with the Association are:—The Geological Society of America: Prof. N. S. Shaler, President; Prof. H. L. Fairchild, Secretary. Society for Promotion of Agricultural Science: Prof. William Saunders, President; Prof. William Frear, Secretary. Association of Economic Entomologists. Association of State Weather Service: Major H. H. C. Dun-